Space Force Culture

A Dialogue of Competing Traditions

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In military organizations, service culture shapes organizational strategy. In the US Space Force today, four historical traditions rooted in different beliefs, values, and assumptions exist, namely, engineers, operators, integrators, and warfighters. Over four periods in Air Force space operations history, a given tradition dominated, while the others competed for currency. This history has implications for contemporary service culture. Changes in the strategic context can reduce a given tradition's effectiveness, though a waning tradition still influences the organization's behavior through its adherents. Understanding these four traditions will help Space Force leaders as they shape service culture today.

Before the US Space Force's first birthday, former Air Force Chief of Staff General David Goldfein asked, "How do we allow the Space Force to develop its own service culture?"[1] As if in response, the Space Force's first doctrine document, signed by the Chief of Space Operations General John Raymond a few months later, mentions culture 15 times across fewer than 60 pages.[2] The service's emphasis on culture is well founded. Organizational culture creates identity and expectations; it frames how members respond to stimuli. In the context of a military organization, service culture enables, shapes, and constrains strategy.

As the Space Force develops a culture in support of its distinctive mission, it must first understand its existing culture with a heritage in Air Force space operations, which provided the preponderance of the new service's personnel, organizations, and missions. Tracing that heritage reveals there is not a unitary space operations culture, but rather several competing traditions: engineers, operators, integrators, and warfighters.

From 1954 to the present, these traditions have competed for influence and currency; this dialogue helps explain the development of American spacepower and has implications for service culture. Changes in the strategic context can reduce a given tradition's effectiveness to the point that another tradition rises to the top. Yet, while a tradition may recede from prominence, it still influences the organization's behavior through its adherents. Therefore, Space Force leaders wanting to shape service culture should understand the traditions at work today.

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1. Charles Pope, "Goldfein Offers Optimistic Update on Air Force's Evolution and Future," Secretary of the Air Force Public Affairs, January 27, 2020, https://www.af.mil/.

2. John W. Raymond, *Spacepower: Doctrine for Space Forces*, Space Capstone Publication (Washington, DC: Headquarters US Space Force, June 2020), https://www.spaceforce.mil/.

This article introduces the four traditions and compares their core assumptions, values, and beliefs.[3] Differences in the traditions create tension in the Space Force today, which the dialogue seeks to resolve. The article concludes with the implications of that ongoing dialogue.

Engineers: Technically Minded Problem Solvers

From 1954, when Brigadier General Bernard Schriever, USAF, stood up the Western Development Division to develop the intercontinental ballistic missile (ICBM), to the activation of Air Force Space Command in 1982, engineers ran most US Air Force space programs.[4] Schriever designed a program management system comprising not just military members but also their colleagues in industry and academia. The system relied on contractors to design, engineer, manage, and build space systems.[5] The engineers assumed this approach to be the most effective at building space systems as it allowed the Air Force to build capacity rapidly, while rather junior officers were appointed to manage large programs.[6] Given the specialized work those officers oversaw, engineers came to value certain traits within their organizations.

Technical competence was and is the coin of the realm for the engineers. Early space systems were not complex, complicated, or robust by today's standards. Because procedures were less developed than they would be in later years, the first engineers required in-depth system expertise and the ability to creatively solve problems on the fly. Early Air Force space organizations like the Western Development Division self-selected for those traits.

Building highly competent technical teams was not only a matter of preference but also an adaptation to the external environment, because high technical risk came with the territory. When running the Division, Schriever oversaw the nation's most expensive weapon acquisition to date, surpassing even the Manhattan Project.[7] His challenge was to deliver a working ICBM anywhere on the globe in minutes, and, importantly, to beat the Soviets to the task.[8]

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3. Edgar H. Schein with Peter Schein, *Organizational Culture and Leadership*, 5th ed. (Hoboken, NJ: John Wiley & Sons, 2017).

4. Jack Ferguson, interview by author, January 25, 2021; and J. Kevin McLaughlin and Chris D. Crawford, "Forward to the Future: A Roadmap for Air Force Space (Part I)," *High Frontier: The Journal for Space and Cyberspace Professionals* 3, no. 4 (August 2007).

5. Howard E. McCurdy, *Inside NASA: High Technology and Organizational Change in the U.S. Space Program* (Baltimore: Johns Hopkins University Press, 1994), 38–39.

6. McCurdy, *Inside NASA*, 39.

7. Walter J. Boyne, "The Man Who Built the Missiles," *Air Force Magazine*, October 1, 2000, https://www.airforcemag.com/; and Stuart M. Powell, "The Day of the Atlas," *Air Force Magazine*, October 1, 2009, https://www.airforcemag.com/.

8. Jacob Neufeld, *Bernard A. Schriever: Challenging the Unknown* (Washington, DC: Office of Air Force History, 2005), 9.

It was a blow to American pride when the Soviets launched Sputnik on October 4, 1957, effectively demonstrating an ICBM capability for the world to see.[9] The event was doubly worrisome since Schriever watched sixteen of his first twenty-five Atlas missiles fail over a two-year period.[10] But he knew the only way to gather enough data to build a working missile was to test them, and, as a result, to fail fast and often. "When at the leading edge of technology and plowing new ground . . . if you do not have a failure every now and then, you are not taking enough risks."[11] Ultimately, Schriever led the Division to create the Thor, Atlas, and Titan ballistic missiles that not only won the missile race, but doubled as the boosters for national security launches such as the Corona spy satellite and civil missions including Mercury and Gemini.[12]

Throughout the Cold War, the engineers tackled risky challenges by managing talented teams of Air Force officers and defense contractors. Some of these engineers' contributions to a peaceful outcome in the Cuban Missile Crisis demonstrates the tradition at work.

In fall 1962, leading up to the crisis, the Director of the National Reconnaissance Office Joseph Charyk, asked Lieutenant Colonel Thomas O. Haig to establish a defense meteorological satellite program (DMSP) downlink capability in Florida, preferably within 24 hours. Although the first operational DMSP had been on orbit for only two months, Charyk wanted to transmit the latest weather imagery to the the RF-101 Voodoo crews conducting photo-reconnaissance flights over Cuba. It was a risky mission, and if the target was cloud covered, as Cuba often was in October, it was futile.[13]

Haig accepted the challenge and led a small team of Air Force and Radio Corporation of America (RCA) engineers to Florida to help with the Cuba situation. It took a logistics miracle to get to Florida, and in rushing to pack the equipment, the team omitted some essential pieces. First, they lacked a transmitter, which they found in the form of an old air traffic control radio. Second, they discovered they were missing an antenna. They scavenged a 3-axis antenna from the base, but it was missing a suitable feed. The RCA engineers' solution was to buy two Yagi antennas from Radio Shack, cross them, and weld the new feed to the dish. They were in business, downlinking DMSP's weather data with no time to spare.[14]

When the first photos came back, the island was socked in, but a small break in the clouds was approaching. It took another DMSP pass to determine the relative motion of

9. Neufield, *Schriever*, 17.

10. E.D. Harris and J.R. Blom, "Apollo Launch-Vehicle Man-Rating: Some Considerations and an Alternative Contingency Plan (U)," Memorandum RM-4489-NASA (Santa Monica, CA: RAND Corporation, May 1965), fig. 1, https://web.archive.org.

11. Thomas P. Hughes, *Rescuing Prometheus: Four Monumental Projects That Changed the Modern World* (New York: Vintage, 2000), 137.

12. Neufeld, *Schriever*, 21–22.

13. *The Satellite Men*, directed by Tom Sylvester (Cary, NC: Pool Room Studios, June 6, 2014), DVD.

14. Sylvester, *Satellite Men*.

the cloud formation and give the meteorologists the confidence to predict the RF-101 launch window. The space weather data proved decisive in the success of the photo-reconnaissance missions that US President John F. Kennedy relied on to hold Soviet Premier Nikita Khrushchev to account. Haig and his engineers played a small but significant role in resolving one of the defining crises of the twentieth century.[15]

As the DMSP story illustrates, the engineers ran early space operations like the research and development projects they were, relying on technical competence, risk acceptance, and a willingness to solve any problem.

Despite the high risks associated with early spaceflight, by the late-1960s, many Air Force space systems had transitioned from experiments to dependable and important military assets. For instance, weather and communications satellites proved to be crucial innovations to American generals in the Vietnam War.[16] In that war, the adversary excelled at irregular tactics, did not mass in large formations, and concealed itself well. As a result, the conflict demanded low-level fighters, higher loiter times for troops in contact, and gunships. In these missions "conventional weather sources proved inadequate to the challenge. Satellite imagery, relayed through the region, provided the answer."[17]

Moreover, some of the first military communications satellites revolutionized information flow into the theater. For example, the Initial Defense Communications Satellite program provided long-haul communications between Saigon, Vietnam and Washington, DC. For the first time, intelligence analysts in the United States could look at imagery and provide reports in near-real-time to Saigon to share with field commanders.

In the 1970s, Air Force senior leaders recognized two important facts. First, space operations were being run piecemeal with no organizing principle, save that they were strategic systems focused on terrestrial needs.[18] As a result, the Air Force was failing to capitalize on the fact that it controlled 80 percent of the space budget but had little bureaucratic clout to show for it.[19] (By the late-1970s, the Air Force had substantial space equities with programs spread across Systems Command, Air Defense Command, and Strategic Air Command.)

Second, leaders realized space operations never emerged from the research and development (or engineering) construct. Senior Air Force officers, nearly all pilots, believed systems should transfer out of program offices, away from engineers and into the hands of operators. To address both issues, they advocated for a single major command for space.

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15. Sylvester, *Satellite Men*.

16. David N. Spires et al., eds., *Beyond Horizons: A Half Century of Air Force Space Leadership* (Maxwell Air Force Base AL: Air University Press, 2011), 169–70.

17. Spires et al., *Beyond Horizons,* 170; and Benjamin S. Lambeth, *Mastering the Ultimate High Ground: Next Steps in the Military Uses of Space* (Santa Monica, CA: RAND Corporation, 2003), 24–25.

18. Spires et al., *Beyond Horizons,* 174–75.

19. Spires et al., 174.

Operators: Procedurally Focused Perfectionists

The operator tradition began with the quintessential operator, the great Cold Warrior, US Air Force General Curtis E. LeMay. Through force of will, LeMay established rigid professionalism within Strategic Air Command, and that model overtook the Cold War Air Force. LeMay forged the command into "a complex of forces, culture, plans, bases, and doctrine that would dominate the Air Force and strategic thinking for almost two decades, worldwide. LeMay's SAC would own the Air Force; SAC was the Air Force."[20] LeMay may be the most dominant personality in Air Force history—although he retired in 1965, his legacy shaped Air Force space operations as they became fully established.

In 1971, the Air Force created Air Force specialty code (AFSC) 20XX for space operations.[21] The initial, few positions only existed in Strategic Air Command and Aerospace Defense Command. The new Air Force Space Command was carved from those organizations precisely where LeMay's customary demand for exact standards and repeatable performance were strongest. Moreover, Air Force Space Command codified a LeMay-like approach by adopting Strategic Air Command and Aerospace Defense Command personnel policies.[22]

In September 1982, two weeks after Air Force Space Command's activation, its first commander, General James V. Hartinger, laid out the organization's purpose. "Space is a place—like land, and sea and air—a theater of operations. . . . We will now have an operational command to manage, control and protect operational space assets."[23] The operators' driving assumption was implicit: space operations should be run like flying operations. Indeed, ten of the first eleven commanders of Air Force Space Command were flying officers.

One of Hartinger's goals for Air Force Space Command was to promote "a much closer relationship between the research and development community and the operational world."[24] Ironically, putting the operators in charge meant relegating the engineers and developmental contractors to facilities and program offices often a thousand miles from where operators controlled their systems.

By the early 1990s, Air Force Space Command had assumed operational responsibility of most systems from the acquirers at Space Systems Division, and most missions had moved to the Consolidated Space Operations Center at Falcon Air Force Base (now

20. Carl Builder, *The Icarus Syndrome: The Role of Air Power Theory in the Evolution and Fate of the U.S. Air Force*, 4th ed. (New Brunswick, NJ; London: Transaction Publishers, 1998), 146, emphasis in original.

21. J. Kevin McLaughlin, "Military Space Culture" (paper prepared for the Commission to Assess US National Security Space Management and Organization, Washington, DC, 2001), 11, https://spp.fas.org/.

22. McLaughlin, "Military Space Culture," 12.

23. James V. Hartinger, "Space: Military Challenges and Opportunities" (speech at the Air Force Association Symposium, Washington D.C., September 16, 1982), in *Orbital Futures: Selected Documents in Air Force Space History,* vol. 2 (Peterson AFB, CO: US Air Force Space Command, n.d.), 680.

24. Hartinger, "Challenges and Opportunities," 684.

Schriever Space Force Base).[25] As a result of transitioning operations from Air Force Space Systems Command to Air Force Space Command, an increasing number of Air Force personnel, instead of contractors, were performing space operations.

The operators came to depend on robust procedures because they did not have the technical expertise of their engineer counterparts.[26] As one example, in 1992, a squadron commander lamented to his boss that his greatest challenge was trying to change "the engineer-oriented contractor approach to launch (relying on extensive personal expertise) to the operator oriented approach used by [Air Force Space Command] (relying on checklists, predeveloped and validated contingency pass plans, and training and certification process)."[27]

By the late 1990s, procedural excellence was the overriding value of the operators. Air Force Space Command leaders considered officers for increased responsibility (and therefore promotion) based on flawless operational evaluations, valuing rote memory and steadfast checklist adherence.[28] The operators were trained to a minimum standard to safely run satellite missions and to call an engineer if they ran into trouble.[29] The engineers, on the other hand, could masterfully manage and build the weapons systems, but often lacked insight into ongoing challenges or Joint warfighting needs.

Moreover, space personnel operated from contiguous US bases in windowless rooms. They had little exposure to the larger Air Force, rarely seeing aircraft or pilots on a regular basis—few space installations even had runways. It is unsurprising that pilots appreciated how space systems contributed to success in Operation Desert Storm but still could not find common ground with space personnel.[30]

In 1991, Air Force Chief of Staff General Merrill A. McPeak proudly proclaimed Operation Desert Storm was "the first space war."[31] Indeed it was the operators' magnum opus, the first full-scale conflict where all the nation's military spacepower was on display.[32] When combat operations began, an unprecedented space infrastructure was in the

25. "Unit History: Consolidated Space Operations Center Turnover," September 27, 1993, in *Space and Missiles Systems Center*, K-WG-SPACE-50-HI V.4 (Maxwell AFB, AL: Air Force Historical Research Agency, January 30, 1992–December 31, 1994).

26. McLaughlin and Crawford, "Forward to the Future," 28.

27. Letter from 3 SOPS/CC to 50 OG/CC, "Ultrahigh Frequency Follow-on Launch Readiness," October 28, 1992, in *History of the 50th Space Wing*, K-WG-SPACE-50-HI V.1 (Maxwell AFB, AL: Air Force Historical Research Agency, January 30, 1992–December 31, 1994), 22.

28. Chad Riden, former space operator, interview by author; and Lieutenant Colonel Daniel Sebeck, USSF, current space operator, interview by author, February 2, 2021.

29. John E. Hyten, "Space Mission Force: Developing Space Warfighters for Tomorrow" (white paper, Air Force Space Command, Colorado Springs CO, June 29, 2016), https://www.afspc.af.mil/.

30. See Benjamin S. Lambeth, *The Transformation of American Air Power* (Ithaca, NY: Cornell University Press, 2000), 233.

31. Craig Covault, "Desert Storm Reinforces Military Space Directions," *Aviation Week and Space Technology* (April 8, 1991), 42.

32. Spires et al., *Beyond Horizons,* 244–45.

theater. Yet the conflict also demonstrated shortfalls in the Air Force space culture, which eventually contributed to the decline of the operators' historical period.

Satellites made coalition operations more lethal and efficient. Space-based intelligence, surveillance, and reconnaissance assets helped coalition forces find, fix, target, and destroy Iraqi maneuver units taking cover under massive dust storms. The defense meteorological satellite program provided essential meteorological data that supplied weather data so pilots could employ their laser-guided munitions, the only precision air weapons of the conflict.[33] Missile warning satellites provided vital alerts to coalition forces and had some success cueing Patriot missile batteries to defend against ballistic missile threats.[34] The featureless Arabian Desert provided the perfect case study for space navigation.

Throughout the war, space systems outperformed expectations and contributed to tactical operations on the largest scale in human history. Yet neither the processes nor the personnel were optimally integrated into combat operations. The *Gulf War Air Power Survey* concluded that achieving "concrete warfighting results" required space to operate outside of traditional functional and organizational boundaries.[35] There were interpersonal challenges, too.

> Until the 1991 Gulf War, Air Force aviators and space officers lived and worked almost literally in separate worlds. . . . Rated airmen, for their part, were quintessential "operators," associated as they were with combat flying and its concerns. In contrast, the Air Force's space professionals evolved not out of the flying community, but rather from the secret worlds of overhead reconnaissance and advanced-systems acquisition. . . . As a result, they brought a pronounced technical approach to their work, which made for an almost preordained divide between the air and space components of the Air Force.[36]

Benjamin Lambeth went on to describe how the "real men" who flew jets referred derogatorily to space professionals as "techies," "pocket rockets," "space cadets," or "space geeks."[37] The space experience in the Gulf War shows while Air Force Space Command leaders succeeded in operationalizing many Cold War-era systems, they fell short in their goal to integrate space operators into Joint warfighting. Bridging the gap between the Cold Warriors and their systems and the new American way of war was the guiding challenge of the integrators.

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33. Thomas S. Moorman Jr., "Space: A New Strategic Frontier," in *The Future of Air Power in the Aftermath of the Gulf War*, ed. Robert L. Pfaltzgraff Jr. and Richard H Shultz Jr. (Maxwell AFB, AL: Air University Press, July 1992), 243.

34. Spires et al., *Beyond Horizons,* 255.

35. Eliot A Cohen, *Gulf War Air Power Survey*, vol. 6, pt. 2 (Washington, DC: US Government Printing Office, 1993), v–vi.

36. Lambeth, *American Air Power*, 233.

37. Lambeth, *234.*

Integrators: Externally Focused Practitioners

Space was central to America's emerging reconnaissance-strike complex, and with the proliferation of GPS-aided and GPS-guided munitions, space capabilities would only become more critical. To be relevant in the post–Gulf War era, then, was to be tactically relevant. Thus, the integrators assumed Air Force Space Command's worth came from what it provided to geographic combatant commanders.

The fall of the Soviet Union led to one of the few genuinely unipolar moments in history, with the United States sitting atop the world order. Absent the threat of a peer adversary in space, the nation had little imperative to pursue space superiority and every rationale to integrate space into military operations. This sentiment reinforced the notion that space operations were an adjunct to warfighting, and Air Force Space Command, a service provider.[38] The integrators' driving assumption was that space operations existed for the benefit of warfighters on the ground, in part, because there was no prospect of conflict in space.

The integrators' focus on tactical integration meant they derived value through external validation. Like operators, integrators valued test scores and evaluation performance as the baseline for measuring competence. Unlike the operators, though, the integrators began emphasizing deployments, major exercise participation, and Weapons School—experiences that could only be gained outside of Air Force Space Command.[39] Here again was a dialogue of cultural traditions at work.

Following the Gulf War, McPeak declared space coequal to air.[40] In the fall of 1992, wanting to capitalize on the postwar momentum for space and address the integration challenges, McPeak established a blue ribbon panel led by US Air Force Lieutenant General Thomas S. Moorman Jr.[41] Acting on one of the panel's recommendations in December 1993, Air Force Space Command expanded its operational focus and integration by creating the Space Warfare Center to develop specific space education and tactics development.[42]

The Space Warfare Center established the Space Tactics School in Colorado Springs, a forerunner to the Space Division of the Air Force Weapons School at Nellis Air Force Base.[43] The Space Division taught space operators how to contribute to the combat air

38. Kenneth Grosselin, "A Culture of Military Spacepower," *Air and Space Power Journal* 34, no. 1 (Spring 2020): 75.

39. Summary of author's findings from dozens of 2021 interviews with former and current space operators.

40. Merrill A. McPeak, "Does the Air Force Have a Mission?" (address at Maxwell Air Force Base, AL, June 19, 1992), in *Orbital Futures: Selected Documents in Air Force Space History*, vol. 1, ed. David N. Spires (Peterson AFB, CO: Air Force Space Command, 2004): 96–99.

41. Spires, *Orbital Futures,* 160–61.

42. George W. Bradley III, "A Brief History of the Air Force in Space," *High Frontier: The Journal for Space and Missile Professionals* 1, no. 2 (Fall 2004): 7.

43. Joseph W. Ashy, "Putting Space in the USAF Weapons School," *USAF Weapons Review* 44, no. 2 (Summer 1996): 2–4.

forces and taught flying officers where space fit with their capabilities. Moreover, the Weapons School signaled credibility to Air Force leaders, most of whom were pilots and often graduates themselves.

But the dialogue with the operators continued, because shortly after the blue ribbon panel issued its findings, US Air Force General Charles A. Horner, commander of North American Aerospace Defense Command, US Space Command, and Air Force Space Command brought ICBM operators—missileers—to the command in 1994. In missileers, Horner saw space-smart officers who he thought would bring a warfighting perspective to Air Force Space Command. In fact, the missileers' biggest influence was in reinforcing the Strategic Air Command dogma still alive in the operator tradition.

There was friction at the outset. As missileers joined space units, career space operators were skeptical of missileers' penchant for detail, precision, rote memorization, and inflexibility.[44] Intercontinental ballistic missile operations demanded procedural mastery and, unlike space operators, missileers were not required to have technical degrees. When space and missiles merged into the new 13SX AFSC, the Air Force reverted to the least common denominator and abolished the technical degree requirement for space operators.[45] These factors contributed to growing critiques of the paucity of technical expertise among space operators.[46]

Despite growing cultural tension within the command, Air Force Space Command harnessed some of the Gulf War's lessons in 1995's Operation Deliberate Force, the NATO air campaign to restore peace to the Balkans. Military satellite communications, space-based intelligence, surveillance, and reconnaissance, and GPS all contributed in a similar fashion to Operation Desert Storm, but Operation Deliberate Force heralded at least two novel uses of spacepower.

First, it was the first combat employment of the satellite-communications-dependent MQ-1 Predator remotely-piloted aircraft.[47] Second, Operation Deliberate Force was the first time a GPS-aided munition, the AGM-84E standoff land-attack missile, was used in combat.[48] The broader category of precision-guided munitions made up nearly 70 percent of the 1,026 bombs and missiles used in Operation Deliberate Force, so the operation proved a critical stepping stone on the path to the emerging way of war focused on detailed and timely intelligence and precision-guided munitions.[49] The developments only accelerated calls to better integrate space in the combat air forces.

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44. McLaughlin and Crawford, "Forward to the Future," 28.
45. Mclaughlin, "Military Space Culture," 18.
46. Mclaughlin, 21–22.
47. Richard L. Sargent, "Aircraft Used in Deliberate Force," in *Deliberate Force - A Case Study in Effective Air Campaigning: Final Report of the Air University Balkans Air Campaign Study*, ed. Robert C. Owen (Maxwell AFB, AL: Air University Press, 2000), 199.
48. Sargent, "Deliberate Force," 261.
49. Robert C. Owen, "Operation Deliberate Force, 1995" in *A History of Air Warfare*, ed. John Andreas Olsen (Washington, DC: Potomac Books, 2010), 202.

Sending space operators to the Air Force Weapons School in 1996 was one of the most important steps Space Command took toward integration. In one example, when US Air Forces Europe sought help from the Weapons School in planning the 1999 Operation Allied Force in Kosovo, the school sent a resident GPS expert to advise the strategy cell on joint direct attack munitions (JDAM) employment considerations. The officer, a graduate from the first class of space weapons officers, encountered resistance right away. Not yet a decade removed from the Gulf War, pilots were reluctant to employ GPS-aided munitions and skeptical of space capabilities in general. This officer's role expanded from space advisor to spacepower advocate.

The officer believed his Weapons School time helped him understand flyers' concerns and how to better argue for employing the JDAM. His arguments helped win over the air commander, Lieutenant General Michael Short.[50] Short later called Operation Allied Force a "precision guidance war." "We would not drop dumb bombs. We would drop bombs guided by laser, or GPS, to be as precise and accurate as we could possibly be."[51] Indeed, given the Kosovo clouds that stymied laser-guided weapons, GPS-aided munitions were the most reliable precision weapons at Short's disposal, and the advocacy by an early space weapons officer-graduate was important to their employment.

Though engineering expertise declined under the integrators, they made tremendous strides in tactical space employment. In the early 2000s, the integrators made substantial contributions to Operations Enduring Freedom and Iraqi Freedom, expertly planning and employing their capabilities in support of the Joint fight. They had every reason to celebrate their ability to support the warfighter. Yet, the tradition that adapted to the challenges of integrating space capabilities into the tactical fight on earth had nothing to say about fighting in space.

Warfighters: Adversary-Focused Theorists

By the mid-2000s, the United States had invested heavily in space assets and space-enabled capabilities across the Joint force. Joint forces depended on myriad integrated space capabilities, including GPS-guided smart bombs, blue-force tracking, numerous intelligence and communications functions that relied on wideband and protected satellite communications, space-based intelligence, surveillance, and reconnaissance, and timely weather information. Unfortunately, America's adversaries and rivals took note. As a revanchist Russia and rising China sought to offset America's advantages, they developed extensive antisatellite weapons (ASAT). One ASAT test event brought this into sharp relief.

50. M.V. Smith, interview with author, May 24, 2021.

51. PBS Frontline, "Oral History: General Michael C. Short," n.d., accessed May 24, 2021, https://www.pbs.org/wgbh/pages/frontline/shows/kosovo/interviews/short.html.

On January 11, 2007, China destroyed its Feng Yun 1C weather satellite with its SC-19 missile and put an end to the 20-year taboo against kinetic ASAT tests.[52] Since Sputnik, no single event has done more to shape Air Force space culture than China's ASAT test. Air Force space operations had to look inward to answer the question, how do we protect and defend the space domain, a question not considered since the Cold War. The test was significant not so much for its military utility as for what it said about the US capacity to deal with a contested space domain.[53] Thus, 2007 signaled the beginning of a shift toward a tradition whose overriding assumption is that space is contested.

The warfighters believe their raison d'être is space superiority. The Space Force's first doctrine document states it plainly, "Military space forces are the warfighters who protect, defend, and project spacepower."[54] The warfighters recognize mere compliance and rigid procedures are not sufficient to compete with a thinking adversary in a dynamic environment.

In the immediate aftermath of the Chinese ASAT test, many space professionals recognized a need to adapt to the changing environment.[55] But at the most senior levels of Air Force Space Command, it took nearly a decade to make a decisive pivot to a warfighting mentality as leaders awaited recognition from civilian leaders.[56] The commander of Air Force Space Command, General John E. Hyten got the unambiguous signal he needed in April 2015 when Deputy Secretary of Defense Robert O. Work asserted Air Force Space Command was not prepared for a conflict in space.[57]

In 2016, Hyten published the Space Mission Force white paper, his plan to shift the command's culture to meet the challenges of the contested domain.[58] His concept challenged space crews to take on more accountability for their own training; to train to failure, and learn through that failure with a culture of self-improvement; to explore root causes and mistakes; and to exercise operational authorities at the lowest level.[59]

Later that year, General John W. Raymond succeeded Hyten as commander and accelerated the efforts to build a warfighting culture. In 2017, Raymond introduced the Space Warfighting Construct, an umbrella concept for six lines of effort, including Hy-

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52. Roger G. Harrison, "Foreword," in *The US Response to China's ASAT: An International Security Space Alliance for the Future*, Drew Paper no. 8, by Anthony J Mastalir (Maxwell AFB, AL: Air University Press, 2009), vii, https://media.defense.gov/.

53. Mastalir, *China's ASAT*, 98.

54. Raymond, *Spacepower*, vi.

55. McLaughlin and Crawford, "Forward to the Future"; Chad Riden, interview; and John E. Shaw, "Guarding the High Ocean: Towards a New National-Security Space Strategy through an Analysis of US Maritime Strategy," *Air and Space Power Journal* 23, no. I (Spring 2009), 56–58.

56. John E. Hyten, interview by George W. Bradley and Rick W. Sturdevant, Air Force Space Command Directorate of History, Oral History Program, April 19, 2016.

57. Hyten, interview.

58. John E. Hyten, "Space Mission Force," 2.

59. Hyten, "Space Mission Force," 4–5.

ten's space mission force, aimed at addressing the contested, degraded, and operationally limited space domain.[60]

Despite those efforts, US Representatives Mike Rogers (R-AL) and Jim Cooper (D-TN), long dissatisfied with the Air Force's stewardship of space, resurfaced the idea for an independent space service. Air Force Space Command responded to the pressure, in part by developing a 2018 talent management framework for space forces.

As with the earlier Space Warfighting Construct, the command was unable to enact the full framework due to time and resource constraints.[61] Nevertheless, it generated more detailed, adversary-centric undergraduate space and follow-on training courses, and invigorated exercises like Space Flag.

Space Flag, modeled after the Air Force's Red Flag, is a tactically focused exercise set in the space domain. It aims to replicate space warfighting with as much fidelity as the military-industrial complex can muster in a virtual environment. Teams of Guardians gather to simulate orbital engagement maneuvers (i.e., dogfighting with satellites). At the exercise, dozens of exercise participants from the US Space Force and the National Reconnaissance Office practice fighting in a contested domain and defeating a highly skilled red team.[62] Though similar in construct to major Air Force exercises, Space Flag has some notable limitations.

As Clausewitz says, friction is what distinguishes "real war from war on paper."[63] There is simply no substitute for live training and exercising. During Space Flag, guardians do not actually move any satellites, they input moves to purpose-built software that replicates how spacecraft should respond. For numerous reasons including safety of flight concerns, fuel limitations, and lack of an orbital maneuver training range, exercising orbital maneuvers has thus far been impractical. Still, in the history of US military space operations, Space Flag is the highest-fidelity orbital exercise that has ever been available to space professionals.

The Space Force has more realistic options in the electromagnetic spectrum where the Space Test and Training Range provides a realistic signal environment where space control operators can wage war with great accuracy against an operator playing the part of an adversary. The service also continues to make investments in more realistic on-orbit training. But nothing can replace combat experience. In fact, the biggest challenge facing the warfighters is their tradition remains aspirational so long as a space war never happens.

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60. Christopher Merian, "AFSPC Commander Unveils Three Major Space Initiatives at 33rd Space Symposium," Air Force Space Command, April 7, 2017, https://www.afspc.af.mil/.

61. Sebeck, interview.

62. Tyler Whiting, "Space Flag, the Premier Exercise for Training Space Forces, Successfully Concludes for the First Time under STAR Delta Provisional," Space Force News, August 21, 2020, https://www.spaceforce.mil/.

63. Carl von Clausewitz, *On War*, ed. and transl. Michael Eliot Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1989), 119.

Notwithstanding substantial efforts like Space Flag, the Air Force could not avoid creating the Space Force, and in 2019, the United States reestablished US Space Command and established the Space Force as a new military branch.

Implications and Recommendations

The article thus far has described cultural traditions contributing to US Space Force culture today. Over each period in Air Force space operations history, one tradition dominated, but other traditions competed for currency, which begs the questions, "What is the Space Force culture today?" and "Why does it matter?"

The warfighter tradition is most prominent today. It follows naturally from the service's mission, that is, to provide freedom of action in, from, and to space. If one substitutes "space" in the preceding sentence with any other domain, it would sound just like the other services' missions, and no one questions whether Soldiers, Sailors, Marines, or Airmen are warfighters. Yet space warfighters are preparing for prospective war with little combat history. Meanwhile, engineers, operators, and integrators still have constituencies in the service. Therefore, the Space Force will be most effective when it understands the various traditions contributing to its culture today.

First, engineers may gain more prominence in the coming years. As the Space Force, already heavily dependent on technology, seeks to become the first digital service and accelerate innovation, engineers may exert more influence over service culture.[64] While one need not have a particular AFSC or degree to be an engineer, trained engineers are more likely to evince the tradition, and acquisition managers and developmental engineers constitute about half of the Space Force officer corps. Moreover, organizations like the National Reconnaissance Office, where many Guardians are assigned, may still be dominated by the engineers today.

Furthermore, space warfighting requires not-yet-fielded technologies. To best harness the engineers' strengths, the Space Force needs to provide well-defined, time-bound, challenging problems that serve its mission, to ensure the means of the space weapon do not become the ends of the engineers' strategy.

Moreover, the Space Force will have to overcome decades of ambivalent policy toward fielding counterspace technologies in light of worrisome advancements by China and Russia.[65] In the mid-1990s, Carl Builder argued that the Air Force mistook the means of

64. John W. Raymond, *Chief of Space Operations' Planning Guidance: 1st Chief of Space Operations* (Washington, DC: USSF, November 9, 2020), https://media.defense.gov/.

65. See Paul B. Stares, *The Militarization of Space: US Policy, 1945–1984* (Ithaca, NY: Cornell University Press, 1985); and United States Defense Intelligence Agency (DIA), *2022: Challenges to Security in Space: Space Reliance in an Era of Competition and Expansion* (Washington, DC: DIA, March 2022), https://purl.fdlp.gov/.

the air weapon for the ends of strategy.[66] If anything, the Space Force is more susceptible to that mistake than was the Air Force.

Second, the operator tradition is still deeply embedded in the Space Force. Though the operators' influence waned after the Gulf War, the tradition lay just beneath the veneer of the integrators' tradition for decades. The operators' rigor and a penchant for standards are not, in themselves, bad things, but the Space Force must balance checklist discipline with creativity and innovation. For the Space Force to build an innovative organization, its leaders will have to measure and reward the right behaviors, which may prove challenging. It is easy to reward performance on objective instruments such as evaluations and written exams; it is far harder to reward Guardians for cultivating a lean and agile organization. It is harder still in the defense bureaucracy whose function is to protect the status quo.

Third, the Space Force should build on the work of the integrators. If the Space Force exists to protect freedom of action in, from, and through the domain, it is because the nation derives power from activities there. For now, military space operations provide value by supporting missions close to the earth's surface. To be Joint warfighters, the Space Force must integrate smoothly with the other services and combatant commands, particularly US Space Command.

What happens, for instance, when space forces supporting the terrestrial combatant commands are organized under a commander of space forces and perhaps not collocated with the Air Operations Center as they have been for decades? With a long record of integrating space into the Joint fight, weapons officers should continue to provide connective tissue between the Space Force, other services, and combatant commands.

Fourth, the warfighters' tradition is well suited to the current and foreseeable international context. Space is contested. China and Russia constitute real threats to American interests in space. Both countries have a range of kinetic and nonkinetic weapons threatening every orbital regime. The Space Force's mission is to preserve freedom of access in space, and it must perform that mission with adversaries in mind.

For now, space warfighting also meets the challenges of domestic and internal contexts. While policymakers and lawmakers of both parties supported creating the Space Force, political support can be whimsical, which calls for a note of caution. On April 18, 2022, Vice President Kamala Harris announced the United States would commit to not conduct destructive, direct-ascent ASAT missile testing.[67] While avoiding irresponsible destructive ASAT testing is sound policy, the declaration may also indicate a shift away from the idea of space warfighting.

It should not be objectionable for a military service charged with defending a specific domain to think in warfighting terms. But there may come a time when service leaders

66. Builder, *Icarus Syndrome*, 29, 35, 179.

67. "FACT SHEET: Vice President Harris Advances National Security Norms in Space," The White House, April 19, 2022, https://www.whitehouse.gov/.

find it less politically appealing to talk about space warfighting. The Space Force would do well to repeatedly communicate the service's value proposition: the nation is best postured to preserve freedom of action in and reap the benefits of the space domain if it has a Space Force. Guardians may prove to be an inspired moniker precisely because it reinforces values of protection and defense.

Setting aside communications' strategies, the warfighter tradition is the most aspirational of the four, and its true test is undoubtedly still ahead, as Raymond said, "The ultimate measure of our readiness is the ability to prevail should war initiate in, or extend to space."[68] The same is true of the warfighting culture the service seeks to build.

Conclusion

The Space Force does not get to create its culture ex nihilo; it has deep roots in the traditions of Air Force space operations. Anyone wishing to understand or shape Space Force culture would do well to understand those traditions and how they interact.

While the Space Force has progressed toward building a culture to meet the demands of today's contested space environment, organizational cultures adapt to changing stimuli. It remains to be seen whether or for how long the warfighters can prevail in the dialogue of competing traditions. More importantly, the open question is: Can the service incorporate the useful elements and shed the restrictive elements of its various traditions? In a future conflict beginning in or extending to space, the answer may prove decisive.✈

68. Raymond, *Planning Guidance*, 1.